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Knowledge, attitude, and clinical skill of emergency medical technicians from Tehran emergency center in trauma exposure

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ABSTRACT

Introduction: Prehospital care is the first part of the trauma treatment and care system. Diagnostic and therapeutic measures taken before these patients arrive at the hospital plays significantly reduce mortality and improve their outcomes. Therefore, the present study aimed to determine the knowledge, attitude, and clinical skill of emergency medical technicians in Tehran Emergency Center in trauma exposure.

Methods: In this descriptive study, 213 participants were selected through stratified random sampling. Data were collected using a four-part questionnaire including demographic information, trauma knowledge questionnaire, trauma attitude questionnaire, and a clinical skill checklist. To compare the level of knowledge, attitude, and clinical skills on the one hand and demographic variables, on the other hand, independent samples *t*-test and one-way ANOVA were utilized. Then, to examine the normality of data distribution, Kolmogorov–Smirnov test with Bonferroni *post hoc* test was used to compare mean scores on different levels of the variables in questionnaires. Data were analyzed in SPSS/17 using descriptive and inferential statistics.

Results: Results showed that the majority of participants (81.1%) had an average knowledge of trauma. Examining their attitude regarding trauma revealed that the majority (88.3%) had a positive attitude toward trauma and taking care of trauma patients. Moreover, the skill of 62.4% of technicians regarding trauma was good. Based on Pearson's correlation, significant positive correlations existed between scores of knowledge and scores of attitude ($r = 0.186$, $P < 0.05$), scores of knowledge and scores of clinical skill ($r = 0.333$, $P < 0.05$), and scores of attitude and scores of clinical skill ($r = 0.258$, $P < 0.05$).

Conclusion: According to the results, emergency medical technicians in Tehran had a good level of knowledge, attitude, and clinical skills in trauma exposure. However, to maintain and enhance the level of knowledge and skills, in-service training should be continued more vigorously and periodically evaluated in the clinical practice.

Key Words: Attitude, clinical skill, emergency medical service, knowledge

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INTRODUCTION

Emergency medical services (EMSs) are an integral part of the health-care system.[1] They cover a range of health-care services including prehospital medical services, emergency services in the hospital, and the trauma system which usually act as the coordinated

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network of trauma care.[2] In today's urban health system, initial examination and treatment of critical patients are usually performed by prehospital emergency technicians. The more correct, accurate, and fast these treatments are the lower the mortality caused by these diseases and the higher the public trust in this system.[3] In fact, prehospital measures are vital for patients. The most important part of the prehospital emergency system is an efficient and operational human force to deal with various types of crashes and diseases.[4,5]

The promotion of knowledge, awareness, and skill in this group facilitates the provision of emergency services.[6] Medical emergencies are the most significant and critical part of medicine. By a correct and timely treatment, patients can be saved from death or disability, while negligence or mistakes may cause irreversible damage.[7,8] At the time of crashes or dangerous crises in diseases, the most effective services can be provided to patients in a very limited time to save their lives and reduce future complications until they are transferred to hospitals.[9,10] In this fast medical relief, the main role is played by an efficient and knowledgeable human force. Therefore, one of the most basic health needs of any society is training individuals with high levels of capability, scientific and practical competence, and moral virtues.[7,11]

Trauma patients are common cases for emergency technicians. Trauma is a common medical emergency with the highest number of calls to EMS.[12] In Iran, trauma is the second-most common cause of mortality in all age groups after cardiovascular diseases.[13]

Based on the estimations of the World Health Organization, by 2020, crashes resulting from traffic collisions alone will be the second cause of years of potential life lost around the world.[14] Health-care service managers are responsible for ensuring the accuracy of the performance of this personnel since any incompetence on their part may have irreversible consequences for patients due to their important role in treatment. Thus, personnel performance evaluations are necessary for organizations, making organizations identify their and their personnel's problems, and strong and weak points and apply necessary corrections.[15] Knowledge plays an important role in the attitude and behavior of personnel. Therefore, it is necessary to plan for the promotion of knowledge, change their attitude, create a desirable performance, and examine their knowledge and attitude to have purposeful educational programs.[16] Studies in Iran show that prehospital emergency technicians do not have a desirable performance compared with global standards. This may be due to lack of knowledge and awareness, attitude, or skill and capabilities, requiring further studies.[3,17] Therefore, the present study aimed to determine the knowledge, attitude, and clinical skill of emergency medical technicians in Tehran Emergency Center (TEC) in trauma exposure.

METHODS

Setting

This descriptive and analytical study evaluated the knowledge, attitude, and clinical skill of emergency medical technicians in TEC in trauma exposure and examined their relationship with demographic variables. The study population comprised all operational emergency medical technicians working in TEC (536 technicians), including physicians, nurses, anesthetists (A.D.), emergency medical technicians (A.D.), and technicians with high school diploma. Inclusion criteria were working at TEC in the operational domain, being employed, minimum 1 year of experience of working in the emergency center, and education level from high school diploma to professional doctorate.

Participants

The study sample comprised 213 eligible operational emergency medical technicians working in TEC and selected from the study population through stratified random sampling based on the formula for computing sample size. The study population (n = 536) comprised physicians (24), B.S. in nursing (218), A.D. in anesthesiology (147), A.D. in medical emergencies (82), and technicians (65).

Ethics statement

The present study was approved by Ethical Committee University of Social Welfare and Rehabilitation Sciences (USWRs). After selecting the eligible participant, the researcher was introduced to them and the objectives of the study were elaborated for the participants. The informed consent was obtained from the participants, and they were assured that their information will remain confidential.

Data collection

Data were collected using a four-part questionnaire including demographic information, trauma knowledge questionnaire, trauma attitude questionnaire, and a clinical skill checklist. The trauma knowledge questionnaire included 50 multiple-choice items selected from the items on prehospital trauma life support examination and prehospital trauma care and then translated to Persian.[18] Each correct response received the score of 1 and each incorrect response received the score of 0. Scores ranged from 0 to 50. Scores of knowledge were classified as: weak (0–16), average (17–33), and good (34–50). Items were compatible with concepts and content of books on prehospital care which was available to all technicians of TEC. The reliability of this questionnaire was assessed using Kudar–Richardson Formula 20 (K-R 20) which is an equivalent of Cronbach's alpha. This value was

0.75 on pretest. As the questionnaire was given to 20 technicians at TEC twice with a 3-week interval, a correlation coefficient of 0.71 was computed to evaluate its repeatability. The trauma attitude questionnaire comprised 30 items which were extracted from many relevant theses which evaluated attitudes. Items were scored on a 5-point Likert scale, including "completely agree," "agree," "do not know," "disagree," and "completely disagree." Scores ranged from 30 to 150. Attitude was classified as weak (30–69), average (70–109), and good (110–150). Cronbach's alpha was used to determine the internal consistency of items on this questionnaire. The value was 0.735 on pretest; showing is good reliability. The correlation coefficient between pre- and post-test equaled 0.83. The clinical skill checklist included nine skills related to prehospital trauma care, prepared based on the Persian translation of the US skill checklist for emergency medical technicians. These skills were as follows: (1) examination of the trauma patient (40 points), (2) spinal immobilization of seated patient (11 points), (3) spinal immobilization of lying patient (13 points), (4) injured long bone immobilization (11 points), (5) injured joint immobilization (9 points), (6) using traction splints (13 points), (7) bleeding control and shock management (11 points), (8) airway management (12 points), (9) intubation, and ventilation (19 points).[6] Performing each item received the score of 1 and failing to perform received the score of 0. Scores ranged from 0 to 139. Scores of clinical skill were classified as follows: weak (0–40), average (46–92), and good (93–139). The objective structured clinical examination (OSCE) method was employed to measure clinical skill. One OSCE station was designed for each skill, with a total of nine stations. All skills were similar for all participants and based on a fixed and standard protocol previously instructed to technicians. The researcher used the noted checklist and observed and recorded the performance of skills.

The reliability of this checklist was assessed using K-R 20 which is an equivalent of Cronbach's alpha. This value was 0.80 for total skills. Questionnaires used in this study were given to 10 professors and experts at the USWR, Road crash, and Medical Emergency Management Center of Iran, and TEC to confirm their face and content validity. Corrections were applied to questionnaires using the opinions of experts. Modified questionnaires were given for final approval to five professors and then printed and copied for the study. This study was approved by the USWR. Data were collected after coordination with the Director of TEC and explaining the objectives of study and confidentiality of data and receiving written consent forms for participation.

Data analysis

Data were analyzed in SPSS/17 (IBM Corp., Armonk, NY, USA) using descriptive and inferential statistics. To compare the level of knowledge, attitude, clinical skills on the one hand and demographic variables on the other hand, independent samples *t*-test and one-way ANOVA were utilized. Then, to examine the normality of data distribution, Kolmogorov–Smirnov test with Bonferroni *post hoc* test was used to compare mean scores on different levels of the variables in questionnaires. Mean scores of knowledge, attitude, and performance were compared using Pearson's correlation coefficient, and means on more than two groups (e.g., mean knowledge per levels of education) were compared using one-way ANOVA. Furthermore, two groups were compared using independent samples *t*-test.

RESULTS

According to the results, most of the participants belonged to the age group of 31–40 years (45.5%). The mean age of participants was 33.53 years with the standard deviation (SD) of 6.15 years. Age ranged from 22 to 55 years. Moreover, 80.3% (171 individuals) were married and 19.7% (42) were single. Other demographic information can be seen in Table 1.

Results showed that, from the total 213 participants, the level of knowledge regarding trauma was good in 17.4% (37), average in 81.1% (173), and weak in 1.4% (3).

Table 1: Sample characteristics (*n* = 213)

Variables	*n* (%)
Marital status	
Single	42 (19.7)
Married	171 (80.3)
Age (year)	
21-30	81 (38.02)
31-40	97 (45.53)
41-56	35 (16.43)
Level of education	
Diploma	21 (9.8)
Associate	89 (41.8)
Bachelor and master	93 (43.7)
General physician	10 (4.7)
Train status	
Trained	145 (68,1)
Untrained	68 (31.9)
Type of shift	
Single shift	114 (53.5)
Two shift	99 (46.5)
Work experience (year)	
1-5	101 (47.4)
6-10	67 (31.5)
11-15	21 (9.9)
16-30	24 (11.2)
Field of study	
General physician	10 (4.7)
Nursing	90 (42.3)
Anesthetists	51 (29.9)
Emergency medical technician	43 (20.2)
Diploma	19 (2.9)
Type of employment	
Official	63 (29.6)
Contract	41 (19.2)
Contractual	42 (19.7)
Corporate recruitment	48 (22.5)
Commitments	19 (9)

Mean score of knowledge was 28.02 with the SD of 5.69. Scores ranged from 12 to 46 [Table 2]. Based on the result of statistical analyses, no significant difference was observed between knowledge and any demographic characteristic ($P < 0.05$).

Data distribution of participants based on their attitude toward trauma showed that the attitude regarding taking care of trauma patients was good in 88.3% (188) and average in 11.7% (25), and no participants had a weak attitude. Mean score of attitude was 118.93 with the SD of 8.4, indicating a good level of attitude [Table 2].

Furthermore, results showed a significant correlation between attitude and train status, degree (level of education), and field of study and work experience ($P < 0.05$). Based on data analysis, 62.4% (133) had a good level of skill regarding trauma and 37.6% (80) had an average level, with no participant with a weak level of skill. Mean score of clinical skill was 99.48 with the SD of 16.659, indicating a good level of clinical skill.

Other results showed a significant correlation between clinical skill on the one hand, and the train status, type of shift, age, level of education, field of study, type of employment, and work experience on the other hand ($P < 0.05$). Based on Pearson's correlation, significant positive correlations existed between scores of knowledge and scores of attitude ($r = 0.186$, $P < 0.05$), scores of knowledge and scores of clinical skill ($r = 0.333$, $P < 0.05$), and scores of attitude and scores of clinical skill ($r = 0.258$, $P < 0.05$) at the level of 0.01 [Table 3].

DISCUSSION

Results of the present study showed that the majority of participants (81.1%) had an average level of knowledge and 17.4% had a good level of knowledge regarding trauma, indicating that the majority of TEC personnel do not have a good knowledge of trauma and principles of providing prehospital care for trauma patients. These results are in line with the study by Nejaty on the knowledge of TEC personnel regarding prehospital trauma care.[19] We believe that, despite the passage of time, little change has occurred in the knowledge of these personnel regarding trauma. This may be due to the presented content, limited educational time, discontinuous nature of education, teaching method, voluntary nature of classes, and failing to read the books. Similarly, the study by Bakhtyiary shows that the effectiveness of in-service information and communication technology programs for high school teachers was below average, showing the importance of motivational factors to increase the effectiveness of these programs.[20] Moreover, Kumar *et al*. examined the level of knowledge, attitude, and performance of three groups of health-care providers in the domain of prehospital and emergency care. They reported that the level of knowledge of participants regarding emergency and prehospital care was below average.[21] Abbasi *et al*. reported the level of knowledge of personnel regarding triage and nuclear medicine is 39.69%.[22] However, Göransson *et al*. report the level of knowledge of nurses regarding triage as average, equal to 57.7%.[23] Malekshahi and Mohamadzadeh report result similar to the present study regarding the knowledge and attitude of nurses of triaging injured patients.[24] The present study showed that most participants (88.3%) had a positive and good attitude regarding the provision of care to trauma patients, and no weak or negative attitude was observed. This result can be justified by examining the questions which assessed attitudes. While providing care to trauma patients, the sense of independence is satisfied in technicians since they do something useful with their skill and capabilities. These results are consistent with the results reported by Kumar *et al*.[21] In a study in Ireland, Relihan *et al*. concluded that the attitude of health-care workers is better than international statistics in all safety dimensions (except for occupational stress).[25] Results of the present study showed that most participants (62.4%) had a good level of skill regarding the provision of care to trauma patients and 37.6% had an average level of skill. No participant had a weak level of skill. The examination of mean scores of each skill showed that the mean scores of participants in this study were less than mean maximum score (50%) on two skills: spinal immobilization of seated patient and using traction splints. These skills are not frequently used and technicians prefer not to use these devices. Therefore, the results seem plausible as practice is required for maintaining skills. Stawicki *et al*. study demonstrated that outcomes in trauma are better during busier months and worse during slower months. Similarly,[26] Kou showed that the knowledge and performance of

Table 2: Distribution of knowledge, attitude, and clinical skill levels in Tehran Emergency Center staff

Variable	Level	*n* (%)	Mean	SD
Knowledge	Good (34-50)	37 (17.4)	28.02	5.69
	Middle (17-33)	173 (81.1)		
	Weak (0-16)	3 (1.4)		
Attitude	Good (110-150)	188 (88.3)	118.93	8.4
	Middle (70-109)	25 (11.7)		
	Weak (30-69)	0		
Clinical skill	Good (93-139)	133 (62.4)	99.48	16.65
	Middle (46-92)	80 (37.6)		
	Weak (0-45)	0		

SD: Standard deviation

Table 3: Relationship between knowledge, attitudes, and clinical skills scores

Variable	Correlation coefficient	*P*
Knowledge and attitude	0.186	0.007
Knowledge and clinical skill	0.333	0.0001
Attitude and clinical skill	0.258	0.0001

prehospital emergency physicians in China in certain aspects of treating patients with traumatic brain injury was not desirable compared to international guidelines.[27] The study by Said *et al*. in Malaysia showed that the EMS personnel have adequate knowledge and skills regarding alert in emergency, examining the scene, and examining the patient. However, they do not have the required knowledge or skills in invasive procedures such as drug administration.[28] The study by Kumar *et al*. revealed that mean performance score of participants regarding prehospital and emergency care was below average.[21] Studnek *et al*. examined the relationship between performance at the scene of EMS and in simulated stations and theoretical examinations in the US. Results revealed that, from among 133 participants, 96% and 32% received an acceptable score in practice and theory, respectively.[15] Results of another study evaluating the skill of pediatric resuscitation using mannequin by emergency paramedic personnel indicated that participants had problems in many cases, including airway care, ventilation, correct use of tubes, calculation, and administration of drugs and liquids.[29] Pearson's correlation coefficient showed a significant positive correlation between knowledge, attitude, and clinical skill of participants. Knowledge affected attitude and attitude affected skill and performance. As knowledge increased, attitude became more positive, and skills were enhanced. Similarly, Studnek *et al*. found a significant correlation between passing practical and theoretical examinations.[15] Nevertheless, the study by Kumar *et al*. showed that emergency medical personnel have inadequate knowledge and skill and require continuous in-service education.[21] A limitation of the present study was the presence of the researcher during the observation of performance and while participants completed the questionnaires which may have affected the results and could not be controlled. Moreover, performance evaluation was done for all participants on models since human cases with similar traumatic conditions were not available.

CONCLUSION

The quality of health-care systems largely depends on the knowledge, attitude, and skills of personnel. As the participants in this study had average knowledge regarding trauma, authorities must pay more attention to this issue and design measures for educating the personnel. Based on the significant correlation between knowledge, attitude, and clinical skills, knowledge evaluation can be performed to support the other variables, since promoting personnel's knowledge will improve their attitude and clinical skills in trauma exposure. Finally, in this research, measurement and evaluation of clinical skills in natural status of trauma patients were not possible, the clinical skill was evaluated on the mannequin; thus, it is proposed the clinical skill of the technicians to be evaluated and analyzed in real conditions if possible.

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Ethical conduct of research

This study was approved by the local Ethics Board and conducted in accordance with the principles laid down in the Declaration of Helsinki.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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